IBM BladeCenter JS21: The power of blade innovation

Overview

The bold, new BladeCenter® JS21 offers significant improvements in performance and reliability over the previous generation JS20 by using the faster IBM PowerPC® 970MP processors and faster and more reliable double data rate 2 (DDR2) memory options and SAS disk subsystem. Along with optional support for Advanced POWER™ Virtualization, the JS21 BladeCenter offers an ideal blade server solution for high-performance computing (HPC), AIX 5L™, and server consolidation.

The new models support a maximum of 16 GB ECC Chipkill™ DDR2 memory, with a choice of 400 MHz or 533 MHz memory DIMMs. Model 31x, with 1 GB DDR2 ECC SDRAM 400 MHz memory standard, offers two single-core, 2.7 GHz, 64-bit PowerPC 970MP processors in the BladeCenter H chassis (2.6 GHz in all other BladeCenter chassis). The 51x, with 2 GB DDR2 ECC SDRAM 400 MHz memory standard, offers two dual-core, 2.5 GHz, 64-bit PowerPC 970MP processors in the BladeCenter H chassis (2.3 GHz in all other BladeCenter chassis). Each processor has 1 MB of L2 cache per core.

Delivering outstanding deployment flexibility, the JS21 may be installed in the BladeCenter, BladeCenter H, or BladeCenter T chassis to help optimize your current and future investments.

Built for speed and reliability, the JS21 BladeCenter supports a choice of operating systems for running HPC Linux clusters as well as AltiVec optimized applications on AIX® or Linux. With virtualization support standard on the JS21, server and workload consolidation of multiple independent applications on a single blade can be provided by Advanced POWER Virtualization for AIX 5L V5.3 and Linux environments by ordering Virtual I/O Server (VIOS) V1.2.1.

For technical details about AltiVec, visit:

http://en.wikipedia.org/wiki/AltiVec

Key prerequisites

- BladeCenter, BladeCenter H, or BladeCenter T chassis
- Network switch module
- Rack

Product number: For details, refer to the Product number section in this announcement.

Planned availability date
March 10, 2006

At a glance

All BladeCenter JS21 models feature:

- Up to 16 GB memory for memory-intensive applications
- Integrated dual gigabit Ethernet
- Integrated systems management processor
- Integrated SAS controller with up to RAID 10 mirroring
- Support for 36 GB or 73 GB SAS disk drives with maximum 146 GB storage
- Support for:
  - Broadcom 5780: PCI-Express and dual gigabit Ethernet
  - Fibre Channel, Myrinet, InfiniBand, and iSCSI TOE connections
  - SUSE Linux Enterprise Server 9 SP3, or later
  - Red Hat Enterprise Linux AS 4 U3, or later, for POWER
  - AIX 5L V5.2 and AIX 5L V5.3
  - AltiVec optimized application development
  - Advanced POWER Virtualization (enabled through Virtual I/O Server)

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AP Distribution

<table>
<thead>
<tr>
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* Bangladesh, Brunei, Myanmar, Sri Lanka, India, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam

Description

High-performance BladeCenter JS21 with increased reliability

The BladeCenter JS21 servers represent the newest offering in the BladeCenter family of high-density, high-performance PowerPC-based servers, with multi-socket processors and high-speed memory options. The model 31x provides 2-socket, single-core, 2.7 GHz PowerPC 970MP processors directly mounted to the planar board. The model 51x provides 2-socket, dual-core, 2.5 GHz PowerPC 970MP processors directly mounted to the planar board. Each processor core includes 32/64 KB L1 (Data/Instruction) and 1 MB (non-shared) L2 cache.

Designed with the demands of enterprise and scientific computing in mind, the JS21 is an excellent solution for high-performance Linux clusters, petroleum exploration, UNIX® applications for retail and finance, Web serving such as with IBM WebSphere®, grid solutions, and any other in-house or commercial application able to exploit the performance acceleration of Altivec extensions for high-speed graphics and data manipulation.

As a heterogeneous infrastructure consolidation platform, all BladeCenter chassis also support running the JS21 alongside your Intel® based HS blades and AMD Opteron based LS blades in the same chassis with independent monitoring, security, power, and systems management. And with several gigabit Ethernet, Fibre Channel, SAN, and InfiniBand high-performance daughter cards to choose from, the JS21 can be tailored to the demands of your datacenter network and application workloads. The JS21 also supports the advanced power management capabilities of IBM Power Executive, an IBM Director extension, to detail the exact power consumption of your BladeCenter servers, for better datacenter planning and maintenance, better reliability, and better performance.

The processor operating frequency is dependent upon the BladeCenter chassis model in which the JS21 is installed. The model 31x operates at 2.6 GHz in a BladeCenter (8677) chassis, 2.7 GHz in a BladeCenter H (8852) chassis, or 2.6 GHz in a BladeCenter T (8720/8730) chassis. The model 51x operates at 2.3 GHz in a BladeCenter (8677) chassis, 2.5 GHz in a BladeCenter H (8852) chassis, or 2.3 GHz in a BladeCenter T (8720/8730) chassis. The JS21 has autonomic power and thermal controls designed to maintain operation in out-of-specification situations. If thermal or power conditions become unacceptable, it may reduce the processor frequency to maintain acceptable conditions. When the conditions are restored to an acceptable value, the blade will again automatically resume normal operation. Some applications may be sensitive to processor frequency changes. Customers should contact their application vendors to determine any possible impacts.

The BladeCenter JS21 performs up to three times faster than the previous generation. As an ideal blade solution for 64-bit UNIX applications, the JS21 also delivers leadership SIMD capabilities with Linux for scientific research and HPC.

Standard JS21 blade configurations

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>L2 Cache</th>
<th>Memory</th>
<th>Ethernet</th>
<th>HDD</th>
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<tbody>
<tr>
<td>8844-31x</td>
<td>2-socket, 1 MB/ 1 GB</td>
<td>Dual</td>
<td>Open</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>single-core, core (2x1GB) Gigabit</td>
<td></td>
<td>2.7 GHz/ 2.6 GHz(1) PPC 970MP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8844-51x</td>
<td>2-socket, 1 MB/ 2 GB</td>
<td>Dual</td>
<td>Open</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>dual-core, core (2x1GB) Gigabit</td>
<td></td>
<td>2.5 GHz/ 2.3 GHz(1) PPC 970MP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Processor frequency is dependent upon which BladeCenter chassis the JS21 is installed:

- BladeCenter (8677): 31x, 2.6 GHz; 51x, 2.3 GHz
- BladeCenter H (8852): 31x, 2.7 GHz; 51x, 2.6 GHz
- BladeCenter T (8720/8730): 31x, 2.6 GHz; 51x, 2.3 GHz

The JS21 has autonomic power and thermal controls designed to maintain operation in out-of-specification situations. If thermal or power conditions become unacceptable, it may reduce the processor frequency to maintain acceptable conditions. When the conditions are restored to an acceptable value, the blade will again automatically resume normal operation. Some applications may be sensitive to processor frequency changes. Customers should contact their application vendors to determine any possible impacts.

Optional/additional features

- Up to 16 GB of system memory
  - The JS21 system board contains four DIMM memory connections.
  - The base JS21 comes with two DIMM slots populated.
  - Memory is two-way interleaved and must be installed in matched pairs.
  - Memory sizes can be mixed.
  - DIMMs must be all PC2-3200 (400 MHz DDR2) or PC2-4200 (533 MHz DDR2); no mixing is allowed.
    - 1 GB (2 x 512 MB Kit) 400 MHz DDR2 Memory DIMM (39M5821)
    - 2 GB (2 x 1 GB Kit) 400 MHz DDR2 Memory DIMM (39M5809)
    - 4 GB (2 x 2 GB Kit) 400 MHz DDR2 Memory DIMM (39M5812)
    - 8 GB (2 x 4 GB Kit) 400 MHz DDR2 Memory DIMM (41Y2703)
    - 1 GB (2 x 512 MB Kit) 533 MHz DDR2 Memory DIMM (41Y2707)
    - 2 GB (2 x 1 GB Kit) 533 MHz DDR2 Memory DIMM (41Y2711)
    - 4 GB (2 x 2 GB Kit) 533 MHz DDR2 Memory DIMM (41Y2715)
- SAS/RAID Controller, supporting up to 146 GB (2 x 73 GB SAS Drive)
- Internal disk drive, SFF (2.5") 36 GB SAS (26K5776)
- Internal disk drive, SFF (2.5") 73 GB SAS (26K5777)
- Topspin Expansion Card for IBM eServer® BladeCenter (26K6457)
- QLogic iSCSI Expansion Card for IBM eServer BladeCenter (26K6487)
- IBM eServer BladeCenter SFF Gigabit Ethernet Expansion Card (26K4842)
- QLogic 4 GB SFF Fibre Channel Expansion Card for IBM eServer BladeCenter (26R0890)
- Myrinet Expansion Card for IBM eServer BladeCenter (73P6000)

**Reliability, availability, and serviceability features:**
Component-level features include:
- Transparent CPU hardware error recovery (for example, for L2 cache errors)
- Memory scrubbing
- Single DIMM failure isolation for CEs; DIMM pair isolation for UEs
- Memory chip kill
- PCI bus parity

Blade-level features include:
- Degraded boot support (memory, CPUs)
- Auto Server Recovery/Restart (automatic reboot after boot hangs or detected checkstop conditions)
- Environmental monitors and alerts
- EPOW support
- System VPD and VPD on all major electronic components
- FRU/CRU-level LEDs
- SMS menu support

BladeCenter based features include:
- Redundant (n+n) power supplies (BladeCenter)
- Power supply error detection (BladeCenter)
- Remote power control
- System event logs (MM)
- Redundant blowers, switches, management modules
- Hot-plug of all BladeCenter FRUs (blowers, switches, power supplies)

**BladeCenter management module:** Use the management module in the BladeCenter to manage the BladeCenter and obtain vital system information about your installed JS21 blade servers. The management module communicates with the blade servers within the BladeCenter via an RS-485 intermanagement network. This network relays vital information about individual blade servers such as:
- Temperature
- Voltages
- Power supply status
- Memory status
- Fan status
- HDD status
- Error and status log

You can receive the status and control all blade servers within the BladeCenter. You can shut down and restart any blade server from anywhere on the network to help save time and costs associated with travel to the actual installation.

These manageability functions are provided through a self-contained Web page, creating an easy and familiar way for administrators to monitor, control, and maintain highly available BladeCenter installations.

**Advanced POWER Virtualization:** With virtualization support built into the JS21, server and workload consolidation of multiple independent applications on a single blade can be provided by Advanced POWER Virtualization for AIX 5L V5.3 and Linux environments by ordering the optional VIOS V1.2.1.

**Statement of general direction**

- IBM eServer Cluster 1350 intends to support the JS21 in its future Cluster 1350 systems during 2Q 2006.
- IBM intends to provide Cluster Systems Management (CSM) for AIX 5L, V1.5 and CSM for Linux on POWER, V1.5 support on the BladeCenter JS21 running AIX 5L V5.2; AIX 5L V5.3, Red Hat Enterprise Linux 4, and SUSE Linux Enterprise Server 9. IBM plans to provide CSM support in a service update during 3Q 2006.
- IBM intends to support the JS21 in the IBM BladeCenter T for NEBS (Telco) environments during 3Q 2006.
- IBM intends to offer an 8 GB (2 x 4 GB) PC2-4200 DDR2 ECC SDRAM RDIMM 533 MHz memory option for the JS21 BladeCenter during 3Q 2006.

All statements regarding IBM’s plans, directions, and intent are subject to change or withdrawal without notice. Any reliance on these Statements of General Direction is at the relying party’s sole risk and will not create liability or obligation for IBM.

**Product number**

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<th>Description</th>
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<td>884431K</td>
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<tr>
<td>BladeCenter JS21</td>
<td>8844 51K</td>
<td>884451K</td>
</tr>
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BladeCenter JS21 8844 31R 884431R
English publications

BladeCenter JS21 8844 51R 884451R
English publications

Note: The following are not GAV.

BladeCenter JS21 8844 31x 884431C 884431D 884431E 884431J 884431N 884431Q
BladeCenter JS21 8844 51x 884451C 884451D 884451E 884451J 884451N 884451Q

Notes:
xxC = China
xxD = China xxN = China
xxE = Japan xxO = India, Nepal, Sri Lanka
xxJ = Japan

The following are newly announced options available for the 8844-31x and 8844-51x:

<table>
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<th>Description</th>
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<td>8844 31x 41Y2703 51x</td>
</tr>
<tr>
<td>1 GB (2x512MB Kit) PC2-4200 CL4 ECC DDR2 SDRAM RDIMM</td>
<td>8844 31x 41Y2707 51x</td>
</tr>
<tr>
<td>2 GB (2x1 GB Kit) PC2-4200 CL4 ECC DDR2 SDRAM RDIMM</td>
<td>8844 31x 41Y2711 51x</td>
</tr>
<tr>
<td>4 GB (2x2 GB Kit) PC2-4200 CL4 ECC DDR2 SDRAM RDIMM</td>
<td>8844 31x 41Y2715 51x</td>
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The following are previously announced options now available for the 8844-31x and 8844-51x:

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<tr>
<td>2 GB (2x1 GB Kit) PC2-3200 CL3 ECC DDR2 SDRAM RDIMM</td>
<td>8844 31x 39M5809 51x</td>
</tr>
<tr>
<td>4 GB (2x2 GB Kit) PC2-3200 CL3 ECC DDR2 SDRAM RDIMM</td>
<td>8844 31x 39M5812 51x</td>
</tr>
<tr>
<td>QLogic 4 GB SFF Fibre Channel Expansion Card for IBM eServer BladeCenter</td>
<td>8844 31x 26R0890 51x</td>
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<td>IBM eServer BladeCenter SFF Gigabit Ethernet Expansion Card</td>
<td>8844 31x 26K4842 51x</td>
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<td>SFF (2.5†) 36 GB SAS HDD</td>
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<td>SFF (2.5†) 73 GB SAS HDD</td>
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Discretionary information

High-performance BladeCenter® JS21: The JS21 blade servers are built for speed and reliability with maximum storage of 146 GB and up to RAID 10 mirroring.

The memory subsystem with ECC and Chipkill™ supports four DIMM slots. Memory DIMMs, PC2-3200 (400 MHz DDR2) or PC2-4200 (533 MHz DDR2) SDRAM DIMMs, ECC, and Chipkill must be installed in pairs.

The memory controller provides:

- Two elastic interfaces for the processors
- A DDR2 SDRAM memory interface to four DIMM sockets
- A HyperTransport (HT) channel

The I/O controller attached to the HT channel provides:

- Integrated Broadcom 5780 with dual gigabit Ethernet
- PCI-Express interface with 17 serial links
- Dual integrated 1 Gb Ethernet controllers
- One PCI-X bus
- Serial-over-LAN for one serial/console port

An integrated SAS RAID controller supports up to two onboard hard drives.

The integrated systems management processor combined with light path diagnostics provides true hardware-based monitoring and alerting.

Solution flexibility is provided with the support of multiple operating systems, optional virtualization within a single blade for AIX 5L™ V5.3 and Linux™ environments, and all BladeCenter chassis.

Standard serial console connection is routed to the Ethernet controller for Serial-over-LAN (SoL) as a dedicated port for the primary serial console support.

Systems management: Systems management for the JS21 BladeCenter:

- AIX 5L V5.2 and V5.3: IBM Director 5.1 and Cluster Systems Management (CSM) for AIX 5L, V1.5 (planned to be available in a service update by 3Q 2006)
- SUSE Linux Enterprise Server 9 SP3, or later: IBM Director 5.1 and CSM for Linux on POWER™ V1.5 (planned to be available in a service update by 3Q 2006)
- Red Hat Enterprise Linux AS 4 U3 for POWER, or later: IBM Director 5.1 and CSM for Linux on POWER V1.5 (planned to be available in a service update by 3Q 2006)

All systems in a cluster with Red Hat must have the same configuration for all software and hardware.

IBM Director V5.1 must be downloaded from http://www-1.ibm.com/servers/eserver/xseries/systems_management/xseries_sm/dwnl.html

- IBM Director V5.1 supports the following functions on the JS21 blade:
  - Events
  - Resource monitoring
  - Inventory (limited)
  - Remote session
  - Software distribution
  - File transfer
  - Process management
  - MPA

- CSM for Linux on POWER V1.5 (planned to be available in a service update by 3Q 2006) (5765-G16) provides a full suite of systems management software for the JS21, including:
  - Hardware control
  - Install and update software on nodes
  - Distributed command execution
  - File synchronization across cluster
  - Monitoring and automated response
  - Automatic security configuration
  - Management of node groups (static and dynamic)
  - Diagnostics tools

- CSM for AIX 5L, V1.5 (planned to be available in a service update by 3Q 2006) (5765-F67)

More information on CSM can be found at http://www-1.ibm.com/servers/eserver/clusters/software/

CSM/IBM Director positioning: CSM is recommended for managing Linux or AIX® clusters if you prefer a scripting interface to perform cluster management tasks. CSM provides full installation for Linux and a flexible command-line interface.

Advanced POWER Virtualization: Advanced POWER Virtualization enables you to consolidate and integrate both AIX 5L V5.3 and Linux applications such as Web serving, IT infrastructure, e-mail, and other in-house applications onto the BladeCenter platform with up to 10 virtual machines per core. Support of Advanced POWER Virtualization on the BladeCenter JS21 brings the power of virtualization to IBM’s entry-level POWER processor-based product.

The Advanced POWER Virtualization option helps to maximize physical resources on BladeCenter JS21 systems. Advanced POWER Virtualization on the BladeCenter JS21 is distinct from Advanced POWER Virtualization on IBM eServer p5 and System p5™ servers. On the JS21, Advanced POWER Virtualization is enabled by ordering VIOS V1.2.1, and is managed through the Integrated Virtualization Manager Interface (a component of VIOS).

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Select your country, and then select the product as the category.

### Technical information

**EMC conformance**

- FCC — Verified to comply with Part 15 of the FCC Rules Class A
- Canada ICES-004, issue 3 Class A
- EMEA: EN55022: 1998 Class A
- Australia/New Zealand: CISPR 22, Class A

**Safety certifications**

- U.S.: (UL Mark) UL 60950-1 1st Edition
- Canada: (cUL Mark) CAN/CSA22.2 No.60950-1 1st Edition
- Europe: (CE Mark) EN60950-1, 1st Edition
- CB: IEC60950-1, 1st Edition
- Russia: (GOST Mark) IEC60950-1

### Operating environment

- Temperature:
  - 10° to 35°C (50° to 95°F) at 0 to 914 m (0 to 3,000 ft)
  - 10° to 32°C (50° to 90°F) at 914 to 2,133 m (3,000 to 7,000 ft)
- Relative humidity: 8% to 80%
- Maximum altitude: 2,133 m (7,000 ft)
- Electrical power:
  - BladeCenter (8677) 200-240 V ac (nominal), 50 or 60 Hz
  - BladeCenter H (8852) 200-240 V ac (nominal), 50 or 60 Hz

- Power consumption:
  - 8844-31x: 344 watts maximum
  - 8844-51x: 376 watts maximum

### Energy value tables

#### BladeCenter Chassis (8677) and JS21 configuration with 16GB Memory and 1 HDD:

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<thead>
<tr>
<th>Machine type/model</th>
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<tbody>
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</table>

#### BladeCenter Chassis (8852) and JS21 configuration with 16GB Memory and 1 HDD:

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</thead>
<tbody>
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<td>Power consumption (watts)</td>
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<td>CTP (MTOPS)</td>
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<tr>
<td>Efficiency Input (Hz) Frequency</td>
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</table>
Energy value tables — BladeCenter T Chassis (8720/8730) and JS21 configuration

Machine type/model 8844-31x 8844-51x
Power consumption (watts) 195.0 229.0
CTP (MTOPS) 58500.0 99667.0
Category J F J F
Energy consumption efficiency Exempt .0033 Exempt .0023
Input (Hz) Frequency 60 60
BladeCenter and BladeCenter JS21 Configuration idling with Linux (at 25°)
CPU 2 CPU — 970/970MP
PSU 2
Mgt Mod. 1 standard
HDD 1 x 36 GB SAS HDD
FDD 1 standard
CD-ROM 1 standard
RAM 4 x 4 GB DIMMs

Software requirements: The following network operating systems have been tested for compatibility with the JS21 blade:

• AIX 5L for POWER V5.2 with the 5200-08 Technology Level (APAR IY77270), plus APAR IY80493 planned to be available March 1, 2006, or a later Technology Level
• AIX 5L for POWER V5.3 with the 5300-04 Technology Level (APAR IY77273), plus APAR IY80499 planned to be available March 1, 2006, or a later Technology Level
• Linux
  - SUSE Linux Enterprise Server 9 for POWER (SLES9 SP3, or later)
  - Red Hat Enterprise Linux AS 4 for POWER (RHEL4 U3, or later)
For AltiVec optimized application development:
  • AIX applications
    - IBM XL C Enterprise Edition V8.0 for AIX
    - IBM XL C/C++ Enterprise Edition V8.0 for AIX
    - IBM XL Fortran Enterprise Edition V10.1 for AIX
    - AIX 5L V5.3 with 5300-04 Technology Level
  • Linux applications
    - IBM XL C/C++ Advanced Edition V8.0 for Linux
    - IBM XL Fortran Advanced Edition V10.1 for Linux
Advanced POWER Virtualization for AIX 5L V5.3 and Linux environments require VIOS V1.2.1 (5765-G34).

Information on Novell SUSE or Red Hat Linux offerings is based upon the latest information available at the time of announcement. Detailed information on either Novell SUSE or Red Hat Linux capabilities or limitations is available on their respective Web sites and is the official specifications for their Linux offerings.

For information or to order Novell SUSE Linux products, visit http://www.suse.com

For information or to order Red Hat Linux products, visit http://www.redhat.com

• All systems in a cluster including Red Hat Enterprise Linux must have the same hardware and software configuration. The following are not supported with Red Hat in a cluster configuration:
  - X windows
  - Print configuration
  - Java™ support
  - Red Hat certified third-party applications
  - Configuration of netdump client
  - Desktop assistance
  - Apache
  - Samba

For additional information support, certification, and version information on network operating systems, access http://www.ibm.com/pc/us/compat

Compatibility: The JS21 blade contains licensed system programs that include set configuration, set features, and test programs. IBM system BIOS is loaded from a “flash” EEPROM into system memory. This BIOS provides instructions and interfaces designed to support the standard features of the JS21 blade and to maintain compatibility with many current software programs.

For detailed information about IBM and non-IBM devices, adapters, software, and network operating systems supported with BladeCenter servers, visit http://www.ibm.com/pc/us/compat

Contact your IBM representative, IBM Business Partner, or refer to the IBM Sales Manual for information on the compatibility of hardware and software for BladeCenter servers. The Sales Manual is updated periodically as new features and options are announced that support these servers.

Limitations

• Two 2,000-watt power modules are in the 8677-3XX BladeCenter with support for two optional 2,000-watt power modules for redundancy and robust configurations. Processor blades 1 to 6 receive their power from power modules 1 and 2. Processor blades 7 to 14 receive their power from power modules 3 and 4. If a JS21 blade is being installed in the 8677-1XX/2XX BladeCenter, the IBM BladeCenter Power Module Upgrade Guidelines (59P6598) will contain a table identifying the power load factor of all possible blades.

• Two hot-swap 1,300-watt power modules are standard in the BladeCenter T (8720-1RX/8730-1RX) to provide redundancy and power for bays 1 through 4 and switch modules 1 and 2. Two additional 1,300-watt power supply modules are required to support installation of blade servers in the BladeCenter T bays 5 through 8 and switch module bays 3 and 4.

• A maximum of one I/O expansion card of any type can be installed in BladeCenter JS21. When an I/O expansion card is installed, it precludes the attachment of the second SAS HDD, unless the I/O expansion card is a Small Form Factor (SFF) card, in which case both the SFF I/O expansion card and the second SAS HDD may be installed at the same time.
• If your BladeCenter chassis was shipped before June 2003, check the following items:
  - An update to the customer interface card on the media tray may be required for proper CD-ROM operation with the JS21 blade. To determine the part number of your existing media tray, from the management module Web interface, under the heading “Monitors” in the left-hand column, select Hardware VPD and then look at the Module Name “media tray.” If the FRU number of the media tray in your blade center is 59P6629, call your hardware support center and request a free replacement media tray.
  - Power modules may need to be upgraded to handle the additional power requirements.

To prevent problems at installation, order any required upgrades along with the JS21. The level of the Ethernet switch module firmware must be at level 81, or higher. To determine the revision level of your existing firmware, from the management module Web interface, under the heading “Monitors” in the left-hand column, select Firmware VPD, then in the table for “I/O Module Firmware VPD” look for the revision number of the “Main Application 1” for the selected Ethernet switch module. If you need new firmware, the latest level is available for download from the Internet at [http://www-306.ibm.com/pc/support/site.wss/document.do?indocid=MIGR-50457](http://www-306.ibm.com/pc/support/site.wss/document.do?indocid=MIGR-50457)

Refer to the Software requirements section for operating system limitations.

**Planning information**

**Cable orders:** No cables required.

**Packaging**

- JS21 Blade carton
  - JS21 Blade
  - Publications/CD package
- Publications package
  - Installation and User’s Guide
  - Documentation CD-ROM (softcopy of publications)
  - Broadcom CD-ROM
  - Safety flyer
  - Blade ID labels

The JS21 blade is shipped in a single package.

**Security, auditability, and control**

Security and auditability features include:

- A power-on password function provides control of who has access to the data and server setup program on the Internet.
- A selectable boot sequence can be used to prevent unauthorized installation of software or removal of data from the diskette drive.

Limitations: The BladeCenter and JS21 blade have no security-intrusion detection; therefore, they should be installed in a rack environment that provides security through lockable doors or other security measures. It is a customer’s responsibility to ensure that the server is secure to protect sensitive data.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

**IBM Electronic Services**

IBM Global Services has transformed its delivery of hardware and software support services to put you on the road to higher systems availability. IBM Electronic Services is a Web-enabled solution that provides you with an exclusive, no-additional-charge enhancement to the service and support available on the IBM eServer platform. These services provide the opportunity for greater system availability due to faster problem resolution and preemptive monitoring. IBM Electronic Services is comprised of two separate, but complementary, elements: IBM Electronic Services news page and IBM Electronic Service Agent™.

IBM Electronic Services news page provides you with a single Internet entry point that replaces the multiple entry points traditionally used by customers to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The IBM Electronic Service Agent is no-additional-charge software that resides on your IBM eServer system. It is designed to proactively monitor events and transmit system inventory information to IBM on a periodic, customer-defined timetable. The IBM Electronic Service Agent tracks system inventory, hardware error logs, and performance information. If the server is under a current IBM maintenance service agreement or within the IBM warranty period, the Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to provide proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent will be made available to IBM service support representatives when they are helping answer your questions or diagnosing problems.

To learn how IBM Electronic Services can work for you, visit [http://www.ibm.com/support/electronic](http://www.ibm.com/support/electronic)

**Terms and conditions**

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM.

**Warranty period**

- System hardware — Three years
- Optional features — Three years

Optional IBM features initially installed in an IBM system carry the same warranty period as the system. If installed after the initial system installation, they carry the balance of the system warranty or the optional feature warranty, whichever is greater.

**Warranty service:** If required, IBM provides repair or exchange service depending on the type of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.
Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM’s normal service area. Contact your local IBM representative or your reseller for country- and location-specific information.

Customer replaceable unit (CRU) (for example, keyboard, mouse, speaker, memory, HDD) service and on-site service for other selected parts.

CRU service: IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU. Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU, at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request IBM to install it at no additional charge under the type of warranty service specified, on-site service.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:

- DASD
- Memory DIMMs
- TOD Battery
- PCI / Daughter Cards
- Expansion Cards
- Labels
- Bezels, Trays, and Covers
- External Cables

On-site service: IBM on-site repair (IOR), 9 hours per day, Monday through Friday excluding holidays, next-business-day response. IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. On-site service is not available in all countries, and some countries have kilometer or mileage limitations from an IBM service center. In those locations where on-site service is not available, the normal in-country service delivery is used.

International Warranty Service (IWS): IWS is available during the warranty period to customers who travel or relocate to countries where their computer is sold and serviced by IBM or IBM resellers authorized to perform warranty service. Eligible IBM computers are identified by their four-digit machine type.

You can obtain IWS through the method of service, such as CRU, depot, carry-in, or on-site, provided in the servicing country. Service methods and procedures vary by country, and some service or parts may not be available in all countries. Service centers in certain countries may not be able to service all models of a particular machine type. In addition, some countries may have fees and restrictions that apply at the time of service.

To determine the eligibility of your computer and to view a list of countries where service is available, visit http://www-3.ibm.com/pc/support/site.wss/warranty/warranty.vm

For more information on IWS, refer to Services Announcement AA01-3100, dated September 25, 2001.

Note: Due to the earth’s magnetic field, CRT monitors are manufactured to work in northern, southern, and equatorial regions of the earth and may not produce a satisfactory image when moved between them. Any required adjustment (if possible) is not covered under IWS and may be subject to a chargeable action. The magnetic field does not affect flat-panel LCD monitors.

Licensing: Programs included with this product are licensed under the terms and conditions of the License Agreements that are shipped with the system.

Field-installable features: Yes

Model conversions: No

Machine installation: Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

Graduated Program License Charges apply: Yes

The applicable processor group for the JS21 BladeCenter is C5.

The applicable processor group for the eServer JS20 BladeCenter is changed from D5 to C5 effective February 14, 2006.

Licensed machine code: IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and for which the customer has acquired. You can obtain the agreement by contacting your IBM representative or at http://www-1.ibm.com/servers/support/machine_warranties/machine_code.html

Educational allowance: None
**Prices**

*ServicePac for warranty service upgrade and maintenance charges*

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For all local charges contact your IBM representative.

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